

WHAT IS CLAIMED IS:

1. A fabrication method for a multi-layered thin film protective layer, which is applicable to a substrate comprising a first device area and a second device area, the method comprising the steps of:

5 forming a first protective layer on the first device area, wherein the first protective layer (prevents) moisture penetration and scratching;

forming a second protective layer on the second device area, wherein the second protective layer has a (high) reflectivity for light transmission; and

10 forming a plurality of oxide material/silicon nitride/oxide material structures as pad spacers in the first device area and the second device area, wherein the pad spacers are higher than the first protective layer;

2. The fabrication method for a multi-layered thin film protective layer according to claim 1, further including:

15 forming sequentially a first oxide layer, a silicon nitride layer and a second oxide layer on the substrate;

defining the second oxide material;

20 defining the silicon nitride layer and the first oxide layer to form a silicon nitride/oxide material structure as the first protective layer in the first device area and to form an oxide material/silicon nitride/oxide material structures in the first device area and the second device area; and

forming a (thin) oxide layer on the substrate as a second protective layer.

3. The fabrication method for a multi-layered thin film protective layer

according to claim 2, wherein the reflectivity of the second protective layer is approximately 85%.

4. The fabrication method for a multi-layered thin film protective layer according to claim 2, wherein the thin oxide layer is approximately 500Å thick.

5. The fabrication method for a multi-layered thin film protective layer according to claim 2, wherein the thin oxide layer includes tetra-ethyl-ortho-silicate.

6. A fabrication method for a multi-layered thin film protective layer, which is applicable to a substrate comprising a peripheral circuit area and a pixel cell area, wherein the peripheral circuit area comprises a plurality of metal layers and the pixel cell area comprises a plurality of pixel cells, the fabrication method comprising the steps of:

filling an insulation material between the pixel cells and the metal layers;
forming sequentially a first oxide layer, a silicon nitride layer and a second oxide layer to cover the pixel cells and the metal layers;

patterning the second oxide layer to define a pre-determined position for a spacer;

defining the silicon nitride layer and the first oxide layer to form a first protective layer and a first spacer in the peripheral circuit area and to form a second spacer in the pixel cell area exposing the pixel cells, wherein the first protective layer is formed with the silicon nitride layer and the first oxide layer, the first spacer and the second spacer are formed with the second oxide material, the silicon nitride layer and

the first oxide material, and the first and the second spacers are higher than the first protective layer; and

forming a second protective layer in the substrate covering the pixel cell area.

5 7. The fabrication method for a multi-layered thin film protective layer according to claim 6, wherein the second protective layer includes a thin oxide layer.

8. The fabrication method for a multi-layered thin film protective layer according to claim 7, wherein the reflectivity of the thin oxide layer is approximately
10 85%.

9. The fabrication method for a multi-layered thin film protective layer according to claim 7, wherein the thin oxide layer is approximately 500Å thick.

15 10. The fabrication method for a multi-layered thin film protective layer according to claim 7, the thin oxide layer includes tetra-ethyl-ortho silicate.

11. The fabrication method for a multi-layered thin film protective layer according to claim 6, wherein the second pad spacer is formed on the isolation material.

20 12. The fabrication method for a multi-layered thin film protective layer according to claim 6, wherein the dimensions for the second pad spacer are approximately 4 microns x 4 microns.

13. The fabrication method for a multi-layered thin film protective layer according to claim 6, wherein the first oxide layer is approximately 1000Å thick.

14. The fabrication method for a multi-layered thin film protective layer
5 according to claim 6, wherein the silicon nitride layer is approximately 4200 thick.

15. The fabrication method for a multi-layered thin film protective layer according to claim 6, wherein the silicon nitride layer serves as an etch stop while defining of the second oxide layer.

10 16. The fabrication method for a multi-layered thin film protective layer according to claim 6, wherein the pixel cells serve as an etch stop while defining the silicon nitride layer and the first oxide layer.

15 17. The fabrication method for a multi-layered thin film protective layer according to claim 6, wherein the step of filling between the pixel cells and the metal layers with an insulation material further includes:

forming an insulation layer on the substrate to cover the pixel cells and the metal layers; and

20 planarizing the insulation layer to expose the pixel cells and the metal layers.

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